Installation and User Guide

COMTROL®
Network Enabling Devices

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Product Overview

The DeviceMaster FreeWire is a high-performance, standalone device designed to connect a wide range of serial devices (i.e., security devices, telecommunications equipment, modems, data display devices, industrial instrumentation, etc.) to an Ethernet network. The DeviceMaster FreeWire supports RS-232 serial interfaces at a variety of baud rates (data transmission speeds), automatically senses both 100baseTX Fast Ethernet and 10baseT Ethernet network connections, and the wireless capability allows connections to 802.11g wireless networks as well.

The installation can be performed by the least-experienced users, while providing networking professionals with advanced features for configuration.

For specification information see the web site: http://www.comtrol.com/products/specifications/31300-7.

DeviceMaster FreeWire Requirements

To use the wireless DeviceMaster FreeWire, you need an 802.11g compatible wireless network consisting of either of the following:

- An 802.11b/g wireless-enabled PC connected directly to the DeviceMaster FreeWire (Ad-Hoc or Peer-to-Peer mode).
- An 802.11b/g wireless access point that allows wireless and wired Ethernet-enabled computers to connect to the serial server.

To configure the wireless DeviceMaster FreeWire, you will need the following information from your wireless network administrator:

- Wireless mode used (Infrastructure or Ad-Hoc)
- The SSID (service set identifier) for your wireless network.
- The Radio Frequency Channel of the wireless network.
- If you are using TCP/IP (recommended for Windows® networks) and are not connected to a DHCP (Dynamic Host Configuration Protocol) server (for obtaining an IP Address automatically), you will need a unique IP Address for the DeviceMaster FreeWire (for example: 192.168.1.14). If the DeviceMaster FreeWire is not on the same IP subnet as the computers you are using, you will also need a subnet mask and a router (default gateway) address.
- Wireless Security Settings (WEP keys, 802.1x settings, etc.)

Installation Overview

The DeviceMaster FreeWire installation follows these steps:

1. Install the hardware (*Hardware Installation* on Page 7).
2. Configure the DeviceMaster FreeWire using one of these methods:
   - DeviceMaster FreeWire Management Utility
   - Web page
   - Console port

   Refer to *Configuration and Management* on Page 13 for configuration procedures.

3. For COM port support, install and configure the port redirector. See *Installing and Configuring the COM Port Redirector* on Page 23 to locate and install the redirector.
4. Connect your serial device to the DeviceMaster FreeWire.

Hardware Installation

This section discusses the following hardware related topics in addition to the hardware installation procedure:

- *Device Descriptions* (below)
- *LED Indicators* on Page 9
- *Reset Button Functions* on Page 9
- *Factory Default Settings* on Page 10
- *Port Parameters* on Page 11

Device Descriptions

The DeviceMaster FreeWire includes the components that are discussed in the following subsections:

- Power connector – The power supply cable plugs into this connector.
- LED status indicators (**Power**, **10**, and **100**) – Indicate the operational states of the DeviceMaster FreeWire. See *LED Indicators* on Page 9 for detailed LED status light descriptions.
- **Reset** button – Pressing the **Reset** button for less than five seconds prints a test page (if the device is connected to a serial printer). Pressing and holding the **Reset** button for more than five seconds resets the DeviceMaster FreeWire to factory default settings (*Reset Button Functions* on Page 9).
- **10/100** – The RJ45 Ethernet port is used for connecting the DeviceMaster FreeWire to an Ethernet card, hub, router, or other wired access point for network access.
- **RS232** – The DB9 serial port can be configured to connect the DeviceMaster FreeWire to a serial device that uses the RS-232 serial interface.

Installing the DeviceMaster FreeWire Hardware

The DeviceMaster FreeWire can be wall mounted, set on the desktop, or mounted using the optional DIN rail kit available from Comtrol Corporation.

1. Write down the 12-digit MAC (Media Access Code) address printed on the label located on the bottom of the DeviceMaster FreeWire (for example: **00 C0 4E 27 00 00**). You may need this number in order to configure the DeviceMaster FreeWire.
2. Plug the DeviceMaster FreeWire power supply adapter into a suitable AC receptacle, and then plug the power supply cable into the DeviceMaster FreeWire. The DeviceMaster FreeWire will run through a sequence of power-up diagnostics for a few seconds.

- If the DeviceMaster FreeWire is operating properly, the LEDs will blink momentarily and then go out, the yellow (**10**) and green (**100**) LEDs will illuminate if the network is active, and the orange (**Power**) LED will illuminate, indicating the device is receiving power.
- The unit powers up in the *Normal* mode, which provides for connection from the network to the device connected to the serial port of the DeviceMaster FreeWire.
- If the **Power** LED blinks continuously in a regular pattern, a problem exists. If this is the case, try powering the unit off and then on again. If the problem persists, refer to *Troubleshooting* on Page 35.

See *LED Indicators* on Page 9 for detailed information about the LEDs.

3. Connect the DeviceMaster FreeWire to your network through a switch or hub using a category 5 (CAT5) Ethernet cable. The DeviceMaster FreeWire IP address must be configured before a network connection is available.
   - The DeviceMaster FreeWire is configured with a static (fixed) IP address of **192.168.250.250** (see your system administrator for assistance). In most cases, a fixed IP address is preferred because a DHCP server may not always assign the same IP address to the DeviceMaster FreeWire when the DeviceMaster FreeWire is powered on.
   - If you want to use DHCP, you must configure the DeviceMaster FreeWire for DHCP during the network configuration process.

   Note: *If a wired connection is established to the unit, the wireless link will be disabled. The IP address must be within a valid range, unique to your network, and in the same subnet as your PC.*
4. Go to *Configuration and Management* on Page 13 for DeviceMaster FreeWire configuration procedures.

LED Indicators

The DeviceMaster FreeWire provides three multifunction LED (Light Emitting Diode) indicators (yellow, green, and orange) for easy monitoring. The following table defines the function of each LED.

Function	State	Status
POWER (Orange)	ON	The DeviceMaster FreeWire is receiving power
	OFF	The DeviceMaster FreeWire is not receiving power
	Blinking	The DeviceMaster FreeWire power supply is malfunctioning
NETWORK STATUS (Yellow/Green)	**Yellow OFF** Green OFF	No network activity
	Yellow ON Green OFF	10baseT network active
	Yellow Blinking Green OFF	10baseT network data received
	Yellow OFF Green ON	100baseTX network active
	Yellow OFF Green Blinking	100baseTX network data received
	Yellow ON Green ON	Wireless network active
	Yellow Blinking Green Blinking	Wireless network data received

Reset Button Functions

Action	Result
Depress for less than 5 seconds	Generates configuration data that can be viewed using a terminal emulator (e.g., Windows Hyper Terminal) or other serial device that can display ASCII characters, or it will initiate a test page if the DeviceMaster FreeWire is connected to a serial printer.
Depress for more than 5 seconds	Resets the DeviceMaster FreeWire's configuration to factory defaults (cold reset). The unit will automatically re-initialize after updating the configuration memory.
Depress for 3 seconds during power up	Places the device into console configuration mode, which can be used to configure the device via the DeviceMaster FreeWire's serial port.

Factory Default Settings

The DeviceMaster FreeWire is shipped with a default configuration that works with the most common serial-to-Ethernet and wireless connections. The default settings can be changed to suit specific installation requirements via the DeviceMaster FreeWire Management Utility, embedded Web server, or via a Telnet connection to the DeviceMaster FreeWire internal console.

The factory default settings can be easily restored at any time by performing a cold reset (press and hold the **Reset** button on the device for more than five seconds).

The following table lists the DeviceMaster FreeWire default settings.

Parameter	Description	Settings
Character	bits per character	8
Flow	flow control	None
Parity	parity	None
Baud rate	bits per second	115,200
Stop	stop bits per character	1
Mode	line mode (serial port protocol)	232
ECABLE	E-Cable mode (for TCP connections)	Disable
ECADDR	E-Cable destination IP address	(set by user)
ECONN	E-Cable connection attempt time	20 seconds
ECPORT	E-Cable destination IP port number	9100
Web browser	password (not case-sensitive)	ACCESS
Network settings	IP address Subnet mask Default Gateway	192.168.250.250 255.255.0.0 0.0.0.0
Protocols	DHCP, static addressing, arp, rasp, and BootP protocols	

Port Parameters

Parameter	Description	Settings
CHARACTER	bits per character	7, **8** (default)
FLOW	flow control	**NONE** (default), Xon/Xoff, CTS/RTS
PARITY	parity	**NONE** (default), EVEN, ODD, MARK, or SPACE
SPEED	baud rate (bits per second)	300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 38400, 57600, 76800, **115200** (default), 230400, 460800
STOP	stop bits per character	**1** (default), 2
MODE	line mode (serial port protocol)	**232** (default), Disabled
ECABLE	E-Cable mode (for TCP connections)	Enable, **Disable** (default)
ECADDR	E-Cable destination IP address	(set by user)
ECONN	E-Cable connection attempt time	**20 seconds**
ECPORT	E-Cable destination IP port number	**9100** (default), or set by user

Note: *The default IP address is* **192.168.250.250**.

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Configuration and Management

Configuration Options

After the hardware installation has been successfully completed, the DeviceMaster FreeWire is ready for configuration. There are three configuration and management methods from which to chose:

- DeviceMaster FreeWire Management Utility (Page 14)
  - User-friendly interface makes configuration fast and easy.
  - Check DeviceMaster FreeWire status information.
  - Print a configuration sheet.
  - Reset the DeviceMaster FreeWire.
  - Save or restore a configuration for the DeviceMaster FreeWire.
  - Configure multiple DeviceMaster FreeWires at the same time.
  - Change options such as the DeviceMaster FreeWire access protocol, time-out values, and status icons.
  - Allows you to update the firmware.
- Embedded web server pages (Page 18)
  - Allow you to configure the DeviceMaster FreeWire with a standard web browser (for example, Firefox or Internet Explorer).
  - No additional software is needed on the system.
  - Can be used on any system that supports web browser capabilities.
  - Type the IP address into your web browser address bar to connect.
- DeviceMaster FreeWire internal configuration console, which can be accessed via a Telnet connection or directly through the DeviceMaster FreeWire serial port (Page 21). The Command Console is a command-line-oriented console:
  - Contains some advanced features not available through the Web Browser Interface.
  - Can be accessed via Telnet or via a direct connection to the DeviceMaster FreeWire's serial port.
  - Requires a DB9 RS-232 null-modem cable for serial connection.
  - Type **HELP** for a list of console commands.

Using the DeviceMaster FreeWire Management Utility

Use the following subsections to install the DeviceMaster FreeWire Management Utility and configure the DeviceMaster FreeWire. Refer to the help system for information about using the DeviceMaster FreeWire Management Utility.

Installing the DeviceMaster FreeWire Management Utility

You can install the DeviceMaster FreeWire Management Utility from the *Software and Documentation* CD shipped with your product or download it from the web site: http://www.comtrol.com/support/download.asp?partnumber=1800353.

Use the following procedure to install the DeviceMaster FreeWire Management Utility.

1. Unzip the DeviceMaster FreeWire Management Utility, execute the **setup.exe** file, and click **Next** at the *Welcome* window.
2. Click **I accept the terms of the license agreement** and **Next** to continue the installation.
3. Click **Next** at the *Choose Destination Location* window.
4. Click **Install** to install the DeviceMaster FreeWire Management Utility.
5. Click **Finish**.

Configuring the DeviceMaster FreeWire

Use the following procedure to configure the DeviceMaster FreeWire.

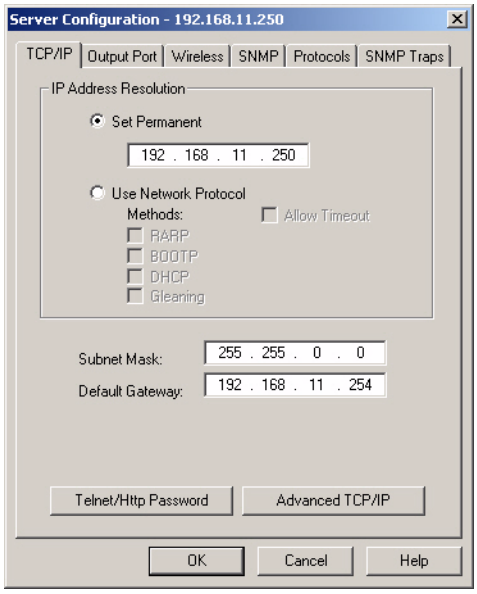
Note: *To configure the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be* **192.168.250.x** *to communicate to the DeviceMaster FreeWire default IP address of* **192.168.250.250**.

1. From the *Start Program* group, click **Comtrol/DeviceMaster FreeWire/ Management Utility**.
2. Click **Next** at the *Welcome* window.
3. Press **Next** to use the default settings or enter a name or change the discovery method. The name or discovery method can be changed later if so desired.

   The DeviceMaster FreeWire Management Utility takes a few moments to locate the DeviceMaster FreeWire.
4. Right-click the DeviceMaster FreeWire in the right pane and click **Configuration**.

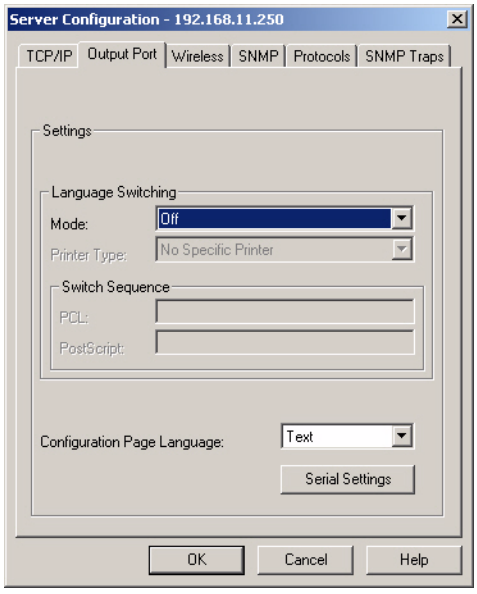
   Note: *Optionally, you can use the* ***Configuration Wizard*** *to configure the IP addresses and serial port parameters for the DeviceMaster FreeWire. After using the wizard, you will need to configure the wireless parameters.*

5. Select the appropriate IP address type and change the IP address to reflect your network requirements. If necessary, see the network administrator for a static IP address.

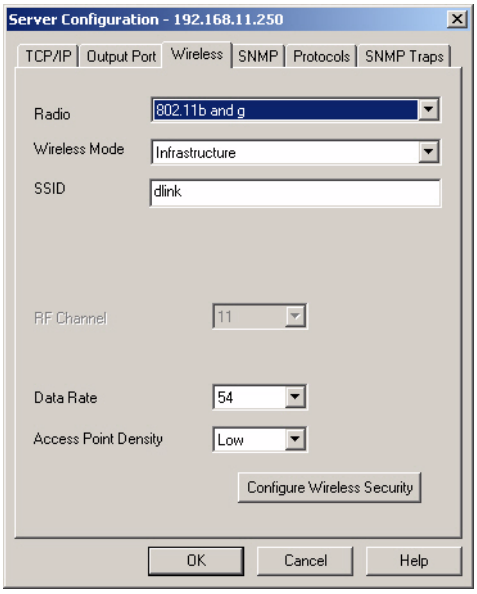


Optionally, configure a telnet/http password or click **Advanced TCP/IP** to change the **TCP Connection Timeout**, **Unsolicited ARP**, or **DNS** settings.

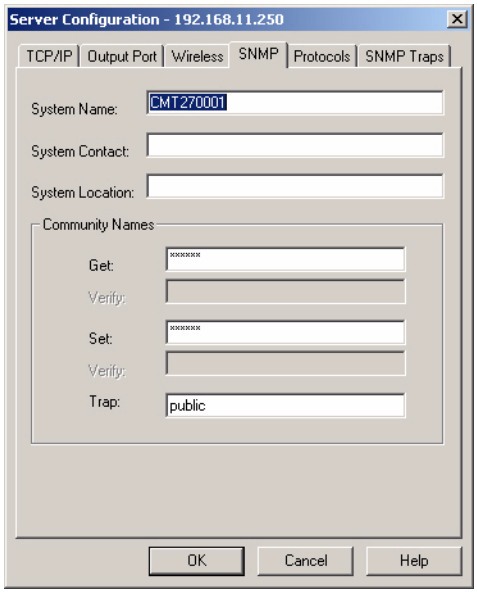
6. To configure output port settings, click the **Output Port** tab and click the appropriate selections for your environment.



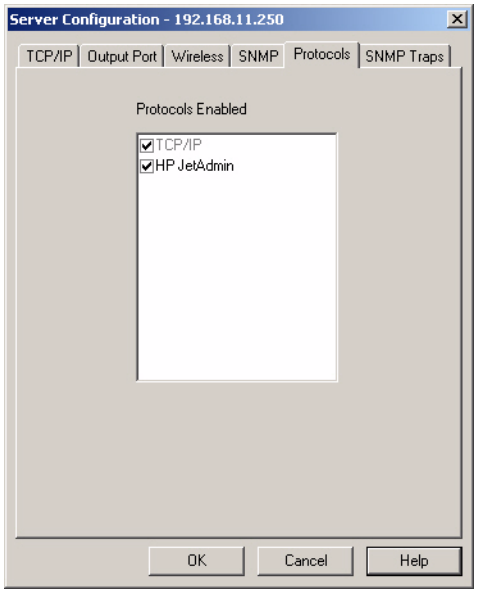
7. Click the **Wireless** tab.
   a. Select the appropriate **Wireless Mode**.
   b. Enter the **SSID** for your wireless network.
   c. If you selected **Ad Hoc**, select the corresponding channel to match your network.
   d. If necessary, change the **Data Rate** and **Access Point Density** values to meet your needs.
   e. If necessary, click **Wireless Security** to set up security settings to match your wireless network.



8. Click the **SNMP** tab if you need to change the default values.



9. Click the **Protocol** tab if you want to disable an available protocol.

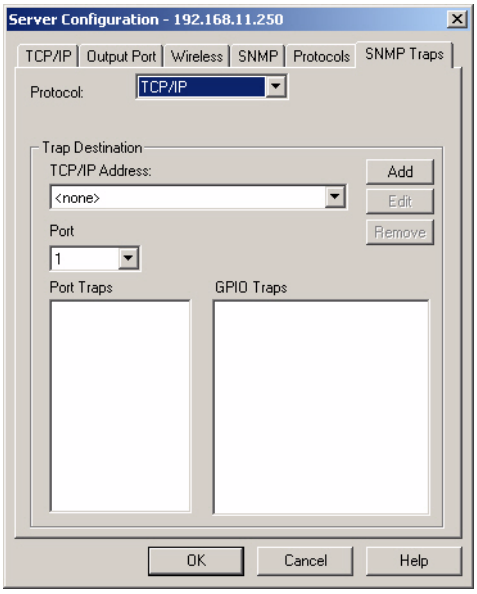


10. Click the **SNMP Traps** tab for set up.
11. Click **Ok** when you are done with the configuration changes and then click **Ok** to the *Save changes and reset device* message.

    It takes several moments for the DeviceMaster FreeWire to reboot with the updated configuration parameters.
12. To confirm wireless operation:
    a. Close the DeviceMaster FreeWire Management Utility and disconnect the Ethernet cable.
    b. Re-open the DeviceMaster FreeWire Management Utility and verify that the DeviceMaster FreeWire appears in the view.

       Note: *It takes approximately 7 seconds before the connection is operational.*

       If the DeviceMaster FreeWire does not appear in the view, see *Troubleshooting* on Page 35.



13. To use the serial port as a COM port, go to *Installing and Configuring the COM Port Redirector* on Page 23 to install and configure the COM port redirector.

After optionally installing the COM port redirector, you are ready to connect the serial device to the DeviceMaster FreeWire.

Refer to *Connecting the Serial Device* on Page 29 for serial port pinout information and *Verifying the Installation* on Page 33 to complete the installation.

Using the Web Browser Interface

Optionally, you can configure the DeviceMaster FreeWire using a standard web browser to access the DeviceMaster FreeWire embedded web server pages, which contain the DeviceMaster FreeWire configuration options. No additional software is required.

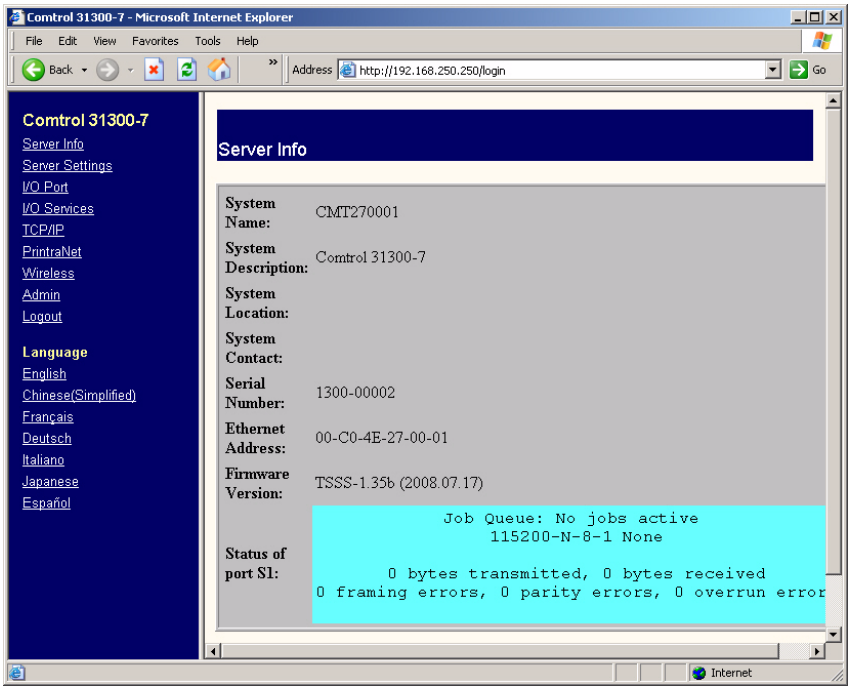
Note: *To configure the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be* **192.168.250.x** *to communicate to the DeviceMaster FreeWire default IP address of* **192.168.250.250**.

1. Verify that your PC is connected and has access to the network.
2. If you have not done so, connect an available Ethernet cable from your network hub to the DeviceMaster FreeWire and verify that the DeviceMaster FreeWire is powered on.

   To operate on an 802.11b/g network, you must set up the same configuration as the wireless network you want the DeviceMaster FreeWire to communicate on. All nodes of a wireless network need to have the same settings in order to communicate with each other.

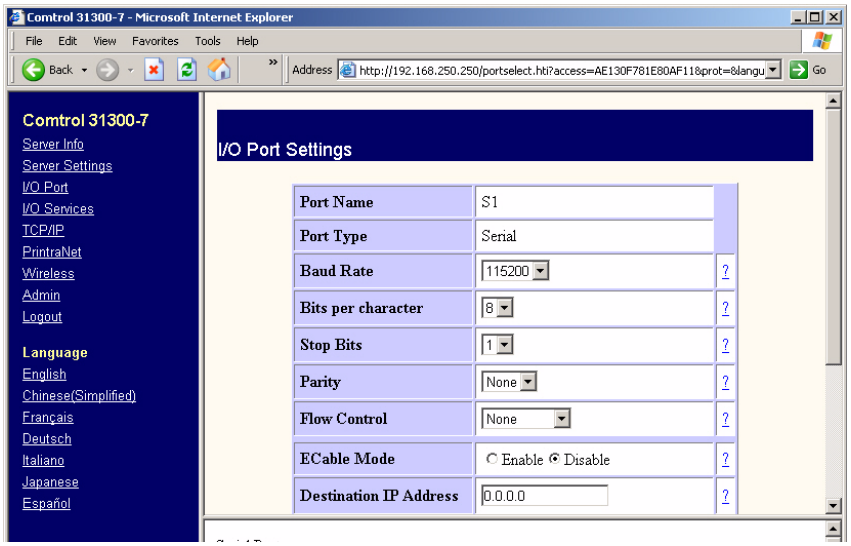
   - Wireless mode (ad-hoc or infrastructure)
   - SSID channel
   - Data rate
   - Security settings (WEP keys, 802.1x settings, etc.)
3. From the host computer, open a standard web browser, enter the IP address of the DeviceMaster FreeWire into the address bar of the web browser, and then press **Enter**.

   The *Web Browser Utility* screen displays.
4. Click the ***Login*** menu selection (left), enter the password (default is **ACCESS**), and then click ***Submit***.

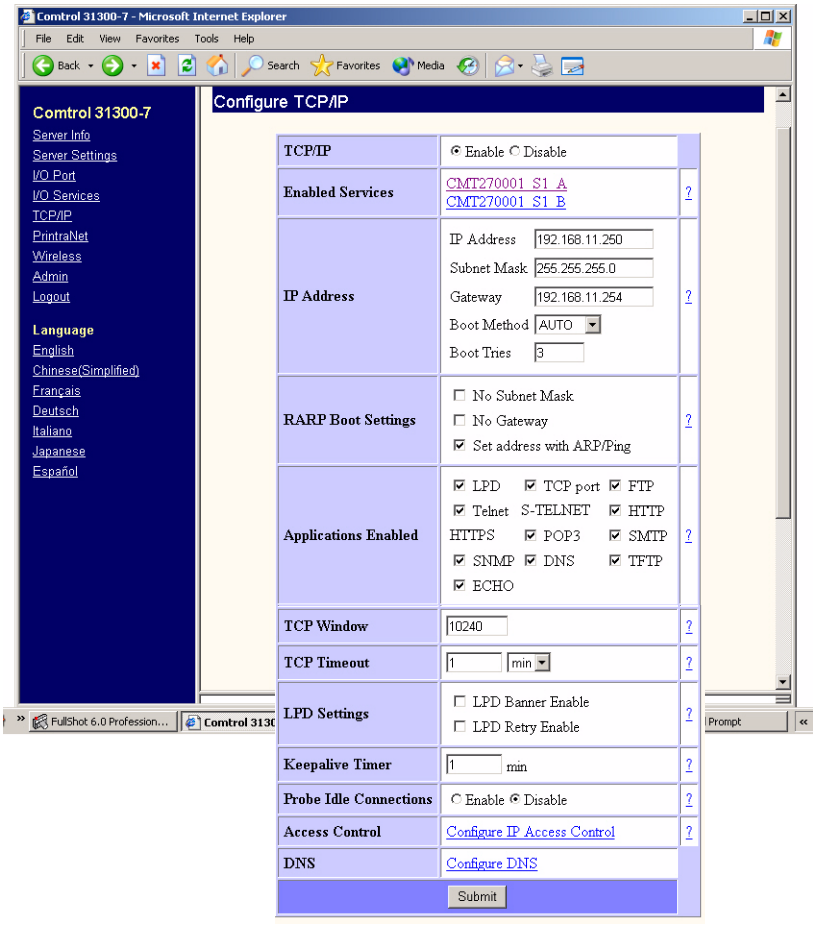


5. Use the web page to configure the settings of the DeviceMaster FreeWire. The menu selections are displayed on the left side of the screen, and the individual settings are located at the top of the screen. At a minimum, you need to configure the following pages:

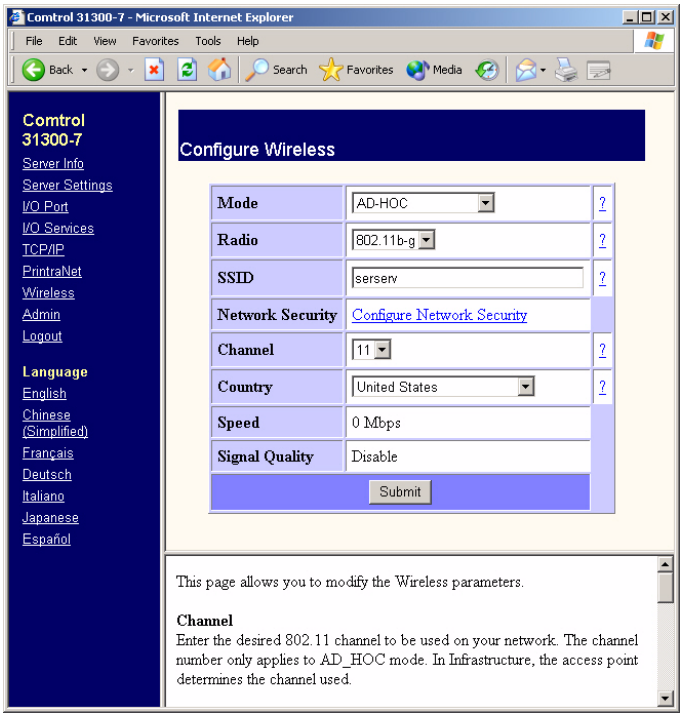
   - **I/O Port** - if you are using the serial port in socket mode.



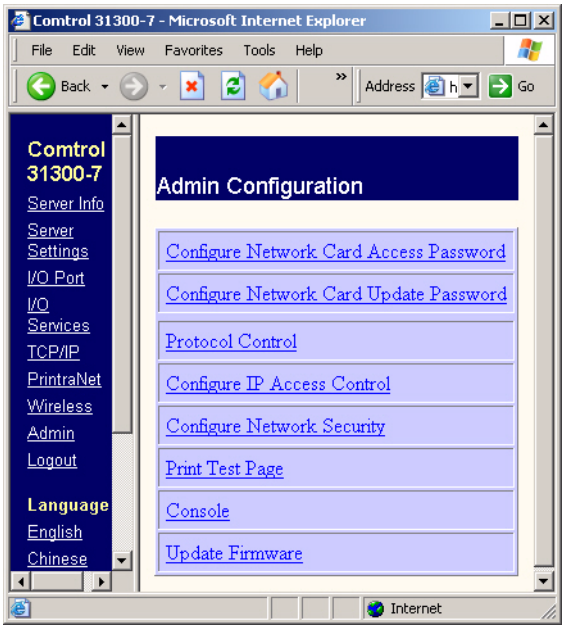
   - **TCP/IP**- to configure the DeviceMaster FreeWire IP address for your network.



- **Wireless** - to configure the wireless settings that match your network.



- **Admin** - you may want to configure network access password and an update password, which prevents unauthorized configuration changes.



6. To confirm wireless operation:
   a. Close the web browser and disconnect the Ethernet cable.
   a. Re-open the web browser, enter the IP address, and verify that DeviceMaster FreeWire web page loads.

      Note: *It takes approximately 7 seconds before the connection is operational.*

      If the web page does not load, see *Troubleshooting* on Page 35.

7. To use the serial port as a COM port, go to *Installing and Configuring the COM Port Redirector* on Page 23 to install and configure the COM port redirector.

After optionally installing the COM port redirector, you are ready to connect the serial device to the DeviceMaster FreeWire.

Refer to *Connecting the Serial Device* on Page 29 for serial port pinout information and *Verifying the Installation* on Page 33 to complete the installation.

Using the Command Console

You can use a telnet or serial connection to configure the DeviceMaster FreeWire using the *Command Console*.

Telnet Connection

Use this procedure to access the *Command Console* through telnet.

Note: *To configure the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be* **192.168.250.x** *to communicate to the DeviceMaster FreeWire default IP address of* **192.168.250.250**.

1. Ensure the DeviceMaster FreeWire is connected via an Ethernet cable to the host computer.
2. From the Windows **Start** menu, click **Run**, and then type the following command (where *x.x.x.x*. is the IP address of the DeviceMaster FreeWire). The system will use the default port **23**.

   ```
   telnet x.x.x.x
   ```

3. After a connection is established, press **Return** or **Enter** to get the **#** prompt, enter the password **ACCESS** (it will not "echo" on your screen), and type anything in response to the **Enter Username>** prompt. When the **Local>** prompt appears, you are ready to enter commands.

   For a list of commands, type **help** at the command prompt.

4. After configuring the DeviceMaster FreeWire, confirm wireless operation:
   a. Close the *Command Console*, and disconnect the Ethernet cable.
   b. Re-open a telnet session, enter the IP address, and verify that a DeviceMaster FreeWire telnet session opens.

      Note: *It takes approximately 7 seconds before the connection is operational.*

      If the telnet session does not start, see *Troubleshooting* on Page 35.

5. To use the serial port as a COM port, go to *Installing and Configuring the COM Port Redirector* on Page 23 to install and configure the COM port redirector.

After optionally installing the COM port redirector, you are ready to connect the serial device to the DeviceMaster FreeWire.

Refer to *Connecting the Serial Device* on Page 29 for serial port pinout information and *Verifying the Installation* on Page 33 to complete the installation.

Serial Connection

The DeviceMaster FreeWire Command Console can be accessed via a direct connection to the DeviceMaster FreeWire serial port using a COM port emulator and a null-modem serial cable.

1. Attach one end of a null-modem serial cable to the DB9 serial port of the DeviceMaster FreeWire, and the other end of the cable to the COM port on your computer.
2. Press and hold the DeviceMaster FreeWire **Reset** button for at least three seconds while powering up the device.

   When the DeviceMaster FreeWire has finished initializing, the internal configuration console will be ready to accept commands.

3. Start a terminal emulation program (e.g., Windows Hyper Terminal), making sure you are connecting with the relevant COM port.

   Note: *You can use Test Terminal (WCOM2), which is available on the CD. You can also download the latest version from the web site:* http://www.comtrol.com/support/download.asp?partnumber=1800355.

4. Use the following settings for the connection:
   - Bits Per Second: **115200**
   - Data Bits: **8**
   - Parity: **None**
   - Stop Bits: **1**
   - Flow Control: **None**
5. Once connected, press **Enter** to continue. The **Local>** prompt appears indicating that the system is ready to accept commands. For a list of commands, type **help** at the command prompt.
6. After configuring the DeviceMaster FreeWire, confirm wireless operation:
   a. Close the *Command Console*, and disconnect the Ethernet cable.
   b. Re-open a telnet session, enter the IP address, and verify that a DeviceMaster FreeWire telnet session opens.

      Note: *It takes approximately 7 seconds before the connection is operational.*

      If the telnet session does not start, see *Troubleshooting* on Page 35.
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Refer to *Connecting the Serial Device* on Page 29 for serial port pinout information and *Verifying the Installation* on Page 33 to complete the installation.

Installing and Configuring the COM Port Redirector

Use this section to install and configure the COM port redirector for the following operating systems:

- Windows 2000
- Windows XP
- Windows Server 2003
- Windows Vista

Note: *The DeviceMaster FreeWire COM Port Redirector is a licensed copy that contains a permanent key.*

Installing the COM Port Redirector

You can install the DeviceMaster FreeWire COM port redirector from the *Software and Documentation* CD shipped with your product or download it from the web site: http://www.comtrol.com/support/download.asp?partnumber=1800352.

Use the following procedure to install the DeviceMaster FreeWire COM port redirector.

1. Execute the COM port redirector assembly and click **Next** at the *Welcome* window.
2. Click **I accept the terms of the license agreement** and **Next** to continue the installation.
3. Click **Next** at the *Choose Destination Location* window.

DeviceMaster FreeWire Version 4.8.6 Setup
Welcome to the DeviceMaster FreeWire Installation Wizard
It is strongly recommended that you exit all Windows programs before running this setup program.
Click Cancel to quit the setup program, then close any programs you have running. Click Next to continue the installation.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
< Back
Next >
Cancel

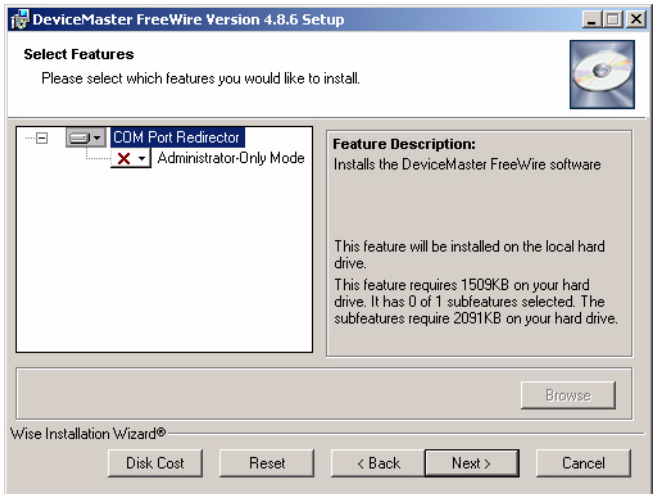
4. Click **Next** to continue the installation.

   Note: *Click **Disk Cost** if you want to see how much space is available on your system.*

5. Click **Next** to continue the installation.

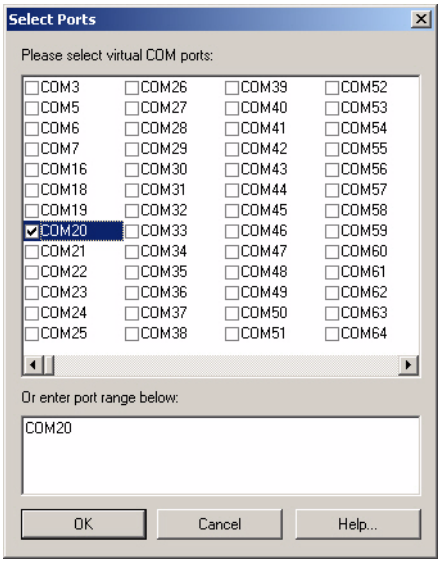
6. Click **Finish**.

   Optionally, review the **readme.txt** file and close it.

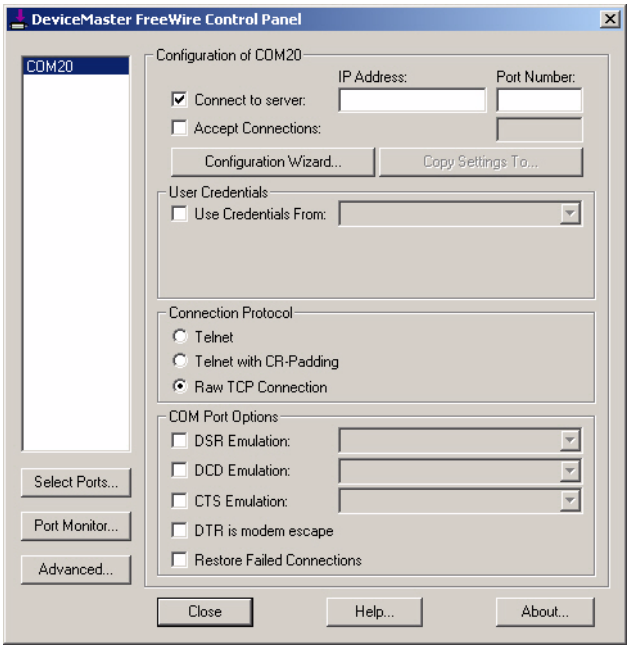

DeviceMaster FreeWire Version 4.8.6 Setup
Select Features
Please select which features you would like to install.
COM Port Redirector
Administrator-Only Mode
Feature Description:
Installs the DeviceMaster FreeWire software
This feature will be installed on the local hard drive.
This feature requires 1509KB on your hard drive. It has 0 of 1 subfeatures selected. The subfeatures require 2091KB on your hard drive.
Browse
Wise Installation Wizard®
Disk Cost
Reset
< Back
Next >
Cancel

7. Select the COM port number that you want to associate with the DeviceMaster FreeWire serial port and click **Ok**.

   Note: *Only available COM ports are displayed.*



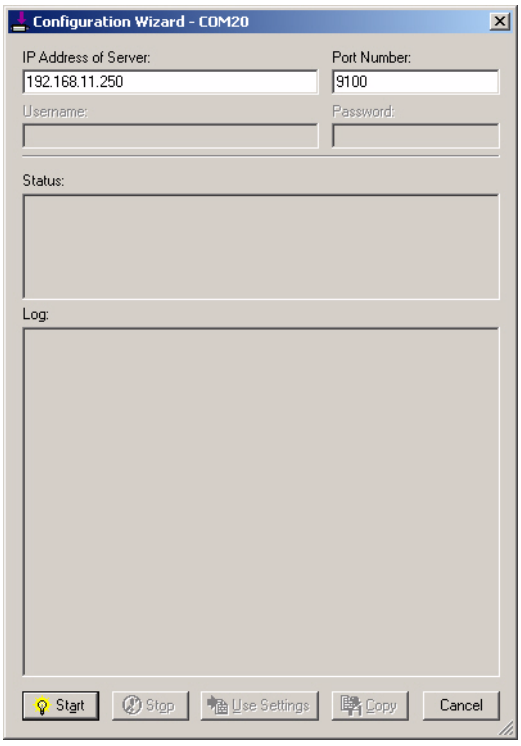
8. Click **Configuration Wizard**.



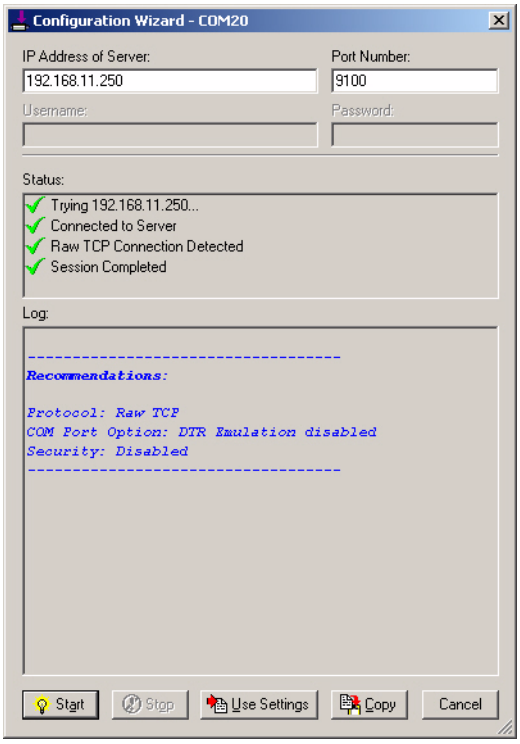
9. Enter the DeviceMaster FreeWire IP address and Port Number and then click **Start**.

   The default port numbers for the DeviceMaster FreeWire Port Number are:

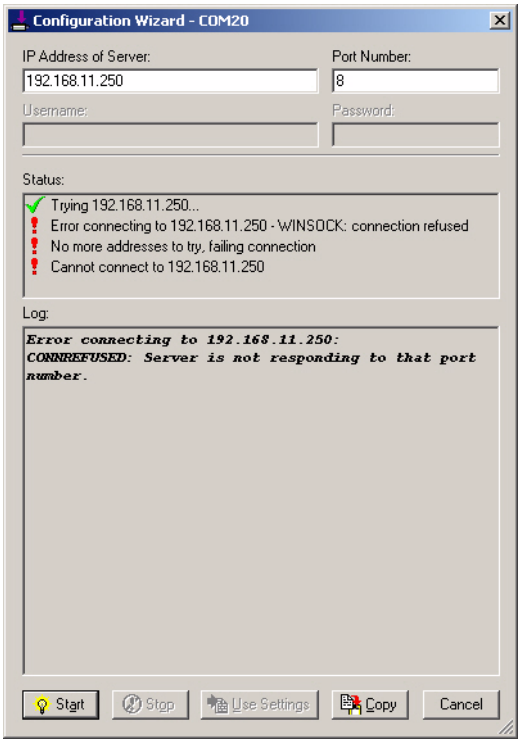
   - Port 9100 - Raw TCP connection
   - Port 9200 - Telnet Protocol



10. Review the DeviceMaster FreeWire status to verify that the DeviceMaster FreeWire connection has been successfully completed and click **Use Settings** to close the wizard.



Refer to help system if the connection fails for troubleshooting information. Click **Stop** to disrupt the verification process, **Copy** to place a copy of the status window contents on the clipboard, and **Cancel** to return to the previous screen.



11. After installing the COM port redirector, you are ready to connect the serial device to the DeviceMaster FreeWire. Refer to *Connecting the Serial Device* on Page 29 for serial port pinout information and *Verifying the Installation* on Page 33 to complete the installation.

Changing the Serial Settings

In order to establish communication between the DeviceMaster FreeWire and a serial device, the serial settings for both devices must match. The serial settings can be changed using the DeviceMaster FreeWire Management Utility, web browser interface, or the DeviceMaster FreeWire internal configuration console. For information refer to *Configuration and Management* on Page 13.

When using the COM port redirector with Telnet, all serial port settings will be configured through the PC application controlling the COM port.

See *Factory Default Settings* on Page 10 for a list of factory default settings.

Accessing the COM Port Redirector

After initial installation of the COM port redirector, access the DeviceMaster FreeWire Control Panel for the COM port redirector through the **Start/All Programs/Comtrol/FreeWire/Control Panel** selection.

Use the **help** system for information about using the port redirector.

Removing the COM Port Redirector

Use the **Add/Remove Programs** *Control Panel* to remove the DeviceMaster FreeWire port redirector.

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Connecting the Serial Device

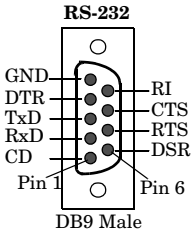
Connect the DeviceMaster FreeWire to your serial device using a standard RS-232 DB9 serial cable. You can build your own null-modem or straight-through DB9 serial cables using the following subsections.

Serial Port Signals

The following table provide serial port pinouts for the DeviceMaster FreeWire.

DB9 Connector Pinouts

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (Ring) or +5 VDC power input (selectable via 3-pin jumper)

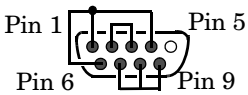


DB9 Loopback Plugs

Loopback connectors are DB9 female serial port plugs, with pins wired together as shown, that are used in conjunction with application software (Test Terminal) to test serial ports. The DeviceMaster FreeWire is shipped with a a single loopback plug (RS-232).

Note: *You can use Test Terminal to test the serial ports. You can use the Support page on the CD shipped with the DeviceMaster FreeWire.*

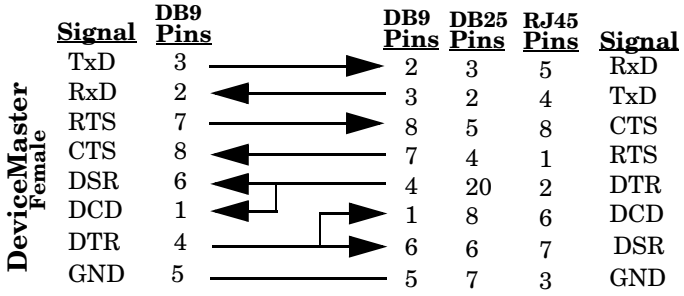
Wire the following pins together to build additional plugs or replace a missing RS-232 loopback plug:



- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9

DB9 Null-Modem Cables

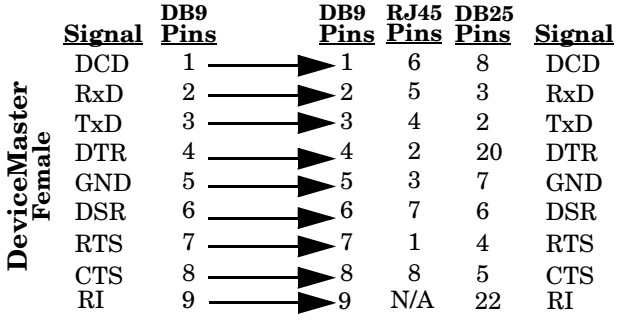
Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required for connecting DTE devices.



Note: *You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.*

DB9 Straight-Through Cables

Use the following figure if you need to build an RS-232 straight-through cable. Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.



TCP Port Connections

The DeviceMaster FreeWire supports port connections over TCP/IP using raw TCP ports only. The TCP ports are allocated as follows.

Port	Destination Device
3001	RS-232
9100	RS-232
9200	RFC 2217
You should set the port to port forwarding in routers and firewalls.	

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Verifying the Installation

There are several ways to verify that the serial port is functioning. This section discusses how to test a serial device able to display ASCII characters.

Refer to the *DeviceMaster FreeWire Software and Documentation* CD for procedures of how to use Test Terminal and the loopback plug to verify that the serial port is functioning.

Use the following procedure to verify that the DeviceMaster FreeWire and the serial device are working correctly.

1. Verify that both the DeviceMaster FreeWire and the connected serial device are powered on and ready, and that a serial cable is properly connected between the DeviceMaster FreeWire and serial device (i.e., transmit signal output from the DeviceMaster FreeWire going to the receive signal input on the serial device, ground leads connected together, etc.).

   Note: *Before attempting to use the DeviceMaster FreeWire, you must verify the connection between the DeviceMaster FreeWire and the connected serial device. If this connection is not working, you will not be able to send and/or receive data from the connected serial device.*

2. Verify that the DeviceMaster FreeWire port settings (i.e., baud rate, flow control, character bit size, parity, etc.) exactly match the settings of the connected serial device port.

3. If the serial device connected to the DeviceMaster FreeWire is able to display or print ASCII characters (such as a terminal emulator or serial printer), then communication between the devices can be verified by pressing the **Reset** button on the DeviceMaster FreeWire for about one second (but less than five seconds), which initiates the output of configuration data from the DeviceMaster FreeWire to the connected serial device.

   - If communication has been successfully established between the two devices, the serial device should be able to display or print the DeviceMaster FreeWire's configuration data.
   - If no data is displayed or printed, verify that both devices are powered ON, are properly connected using a suitable serial cable, and are using compatible serial port parameters. The two most common serial communication problems are due to the either the cabling and/or mismatched serial port parameters.

Note: *If the DeviceMaster FreeWire is connected to a serial device that cannot display or print ASCII characters, then it is recommended that another serial device capable of displaying or printing ASCII characters be temporarily connected to the DeviceMaster FreeWire in order to verify the serial connection. After successful communication is verified using the temporary serial device, reconnect the original serial device, making sure that the original serial device is configured with serial port parameters that match the tested connection.*

If you are having installation problems, see *Troubleshooting* on Page 35 or the *Software and Documentation* CD for assistance.

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Troubleshooting

Introduction

This section describes procedures for troubleshooting problems you may encounter with the DeviceMaster FreeWire, and is divided into the following sections:

- *Troubleshooting Installation Problems*
- *Troubleshooting Network Configuration Problems* on Page 35
- *Troubleshooting Windows Problems* on Page 36
- *Troubleshooting Wireless Configuration Problems* on Page 36

If your problem is not resolved using the troubleshooting sections, you can use *Where to Get Help* on Page 37 for additional help.

Troubleshooting Installation Problems

If you cannot access the connected serial device via the DeviceMaster FreeWire, first check the network connection and cabling.

- Check the physical cabling to ensure all cables are plugged in (Ethernet and DB-9 serial cable).
- If the appropriate LEDs are not illuminated, then there is probably a bad 10baseT or 100baseTX cable, or the hub port is bad. If possible, try a different cable and hub port, or try connecting a different device to the cable.
- Verify that you using the correct values for both IP Address and Port Number. A common mistake is to assume the TCP port number is the “device number” on the server.
- If you are using a hub, verify that the hub port is operating correctly by trying the DeviceMaster FreeWire on a different port.

Troubleshooting Network Configuration Problems

The following information may help you diagnose network configuration problems.

- If you are using TCP/IP, make sure that your computer and the DeviceMaster FreeWire are on the same IP segment or can reach each other with a **PING** command from the host. The IP address you assign to the DeviceMaster FreeWire must be on the same logical network as your host computers (e.g., if your computer has an IP address of **192.189.207.3**, the DeviceMaster FreeWire should have an IP address of **192.189.207.x**, where **x** is an integer between 1 and 254), or you must properly configure your router address to work with the DeviceMaster FreeWire.
- If your DeviceMaster FreeWire is set to **Auto** or **DHCP** for obtaining an IP address, it is possible that the DeviceMaster FreeWire IP address can change. Either configure your DHCP server to give the DeviceMaster FreeWire a permanent lease, or configure the DeviceMaster FreeWire to be on a **STATIC** IP address outside the scope of the DHCP addresses.

- The problem may be the result of mismatched or duplicate IP addresses. Verify that the IP address is correctly loaded into the DeviceMaster FreeWire (via the displayed or printed configuration information or through the remote console), and make sure that no other nodes on the network have this address (duplicate addresses are the biggest cause of TCP/IP connectivity problems). If the IP address is not correct, then check whether the loading procedure was properly executed.
- Verify that the host computer and the DeviceMaster FreeWire are either on the same subnet (for example, if the DeviceMaster FreeWire has a subnet mask of 255.255.255.0, the host must have the same subnet mask) or that the router is properly configured to pass data between the two devices.
- If the wrong IP address is loaded, check your network for file servers that have DHCP, BOOTP, or rarp enabled, and make sure that these file servers are not set up to load IP addresses into the DeviceMaster FreeWire.

Troubleshooting Windows Problems

- If you are having trouble accessing the connected serial device through Windows, ensure you can ping the DeviceMaster FreeWire using the DOS command **PING *ipaddress***, where ***ipaddress*** is the IP address of the DeviceMaster FreeWire. If you cannot ping the DeviceMaster FreeWire, you will not be able to access the serial device.
- If the DeviceMaster FreeWire COM port redirector reports an error, verify that the correct serial/IP COM port is being used when the application runs. Verify that your application's COM port settings have been changed to use the serial/IP COM ports.

Troubleshooting Wireless Configuration Problems

- Verify that your PC's wireless adapter and/or access point is configured properly – note the settings, paying special attention to the wireless mode, SSID or network name, WEP or security, and IP address settings so you can configure your DeviceMaster FreeWire to the same wireless settings.
- Make sure you have a good wireless signal from your PC and from the DeviceMaster FreeWire, that the DeviceMaster FreeWire is within range (90 meters or 300 feet), and that it is away from metal objects and other devices that generate radio signals (like Bluetooth devices, cordless phones, and microwave ovens).
- Make sure your computer is set to infrastructure mode if you are connecting through an access point, or ad-hoc (802.11) if you are connecting to the DeviceMaster FreeWire without an access point. See the documentation for your wireless adapter for details.
- If you want to use WEP encryption or password protection for your wireless network, and your wireless adapter or access point normally uses a password or passphrase instead of WEP, it should allow you to enter 0x followed by a 10-digit key (for 40-bit or 64-bit WEP) or 26-digit key (for 128-bit WEP) in hexadecimal format (0-9 or A-F).
- If you are experiencing slow performance or are having intermittent problems connecting, try changing the RF channel of your wireless network. The RF channel can be changed via the web browser configuration utility for the DeviceMaster FreeWire. See your wireless adapter and/or access point documentation for more information. When changing the RF channel, it is recommended that you select a channel that is at least three channels lower or higher than any other wireless networks within range.

Where to Get Help

Comtrol Corporation offers several customer support options to assist you in the event you experience difficulties with the DeviceMaster FreeWire, including telephone support, repair services, and warranty.

Your first point of contact for technical support is the Distributor or Dealer from whom you bought your product. They are familiar with your needs, and will generally be able to provide you with the fastest and most comprehensive support. If your Distributor or Dealer is unable to answer your questions or is for some reason not available, then contact Comtrol Corporation.

Before contacting Technical Support, please refer to the troubleshooting suggestions or the web site in this manual to isolate any problems, and be sure to write down any error messages. Also, make sure that you have the serial number of the product (located on the product label on the back of the DeviceMaster FreeWire).

Comtrol Contact Information	
Downloads	http://www.comtrol.com/downloads
Web site	http://www.comtrol.com
Forum	http://formum.comtrol.com
Phone	(763) 494-4100

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Safety and Regulatory Notices

This section provides the following:

- *Information for United States Users*
- *Declaration of Conformity (FCC)* on Page 40
- *Information for Canadian Users (IC notice)* on Page 40
- *Information for European Users* on Page 40

Information for United States Users

This equipment has been tested and found to comply within the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver, Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The radiated output power of the print server is far below the FCC radio frequency exposure limits. Nevertheless, print server shall be used in such a manner that the potential for human contact during normal operation is minimized.

To satisfy RF exposure requirements, this device and its antenna(s) must operate with a separation distance of at least 20 centimeters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with specific operating instructions for satisfying RF exposure compliance.

Declaration of Conformity (FCC)

According to 47CFR, Part 2 and 15 for Class B Personal Computers and Peripherals; and/or CPU Boards and Power Supplies used with Class B Personal Computers:

Comtrol Corporation
6655 Wedgwood Road
Maple Grove, MN 55311

Declare under sole responsibility that the product identified herein, complies with 47CFR Part 2 and 15 of the FCC rules as a Class B digital device FOR HOME OR OFFICE USE. Each product marketed, is identical to the representative unit tested and found to be compliant with the standards. Records maintained continue to reflect the equipment being produced can be expected to be within the variation accepted, due to quantity production and testing on a statistical basis as required by 47CFR §2.909. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information for Canadian Users (IC notice)

The term “IC” before the radio certification number only signifies that Industry of Canada technical specifications were met. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment that is installed outdoors is subject to licensing.

This device has been designed to operate with an antenna having a maximum gain of 2 dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen than the equivalent isotropically radiated power (EIRP) is not more than the required for successful communication.

Information for European Users

The server and its built-in 802.11b, and 802.11g wireless technology is in compliance with the Class B Information Technology Equipment requirements and other relevant provisions of European Directive 1999/5/EC. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communications devices. The internal function is a radio device using the 2.4 GHz frequency band (2.400GHz - 2.4845 GHz). It is intended for wireless communication with other 802.11b, and 802.11g-enabled devices in an indoor environment.

The use of 802.11b, and 802.11g wireless technology in certain countries may be restricted. Before using 802.11x products, please confirm with the frequency management authority in the country where you plan to use it. Many countries allow indoor use only. In Italy, general authorization is required if used outside. In France, the use of certain channels is restricted outdoors. In some situations or environments, the use of 802.11x wireless technology might be restricted by the proprietor of the building or responsible representatives of the organization, for

example, in airplanes, in hospitals or in any other environment where the risk of interference with other devices or services is perceived or identified as harmful.

If you are uncertain of the policy that applies to the use in a specific organization or environment, you are encouraged to ask for authorization to use 802.11x wireless technology prior to switching it on. Consult your physician or the manufacturer of personal medical devices (pacemakers, hearing aids, etc.) regarding any restrictions on the use of 802.11x wireless technology.

Comtrol Corporation cannot be responsible for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product.

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